3 NATIONAL AIRSPACE SYSTEM ACTIVITY AND SOURCES OF DEMAND

3 NATIONAL AIRSPACE SYSTEM ACTIVITY AND SOURCES OF DEMAND

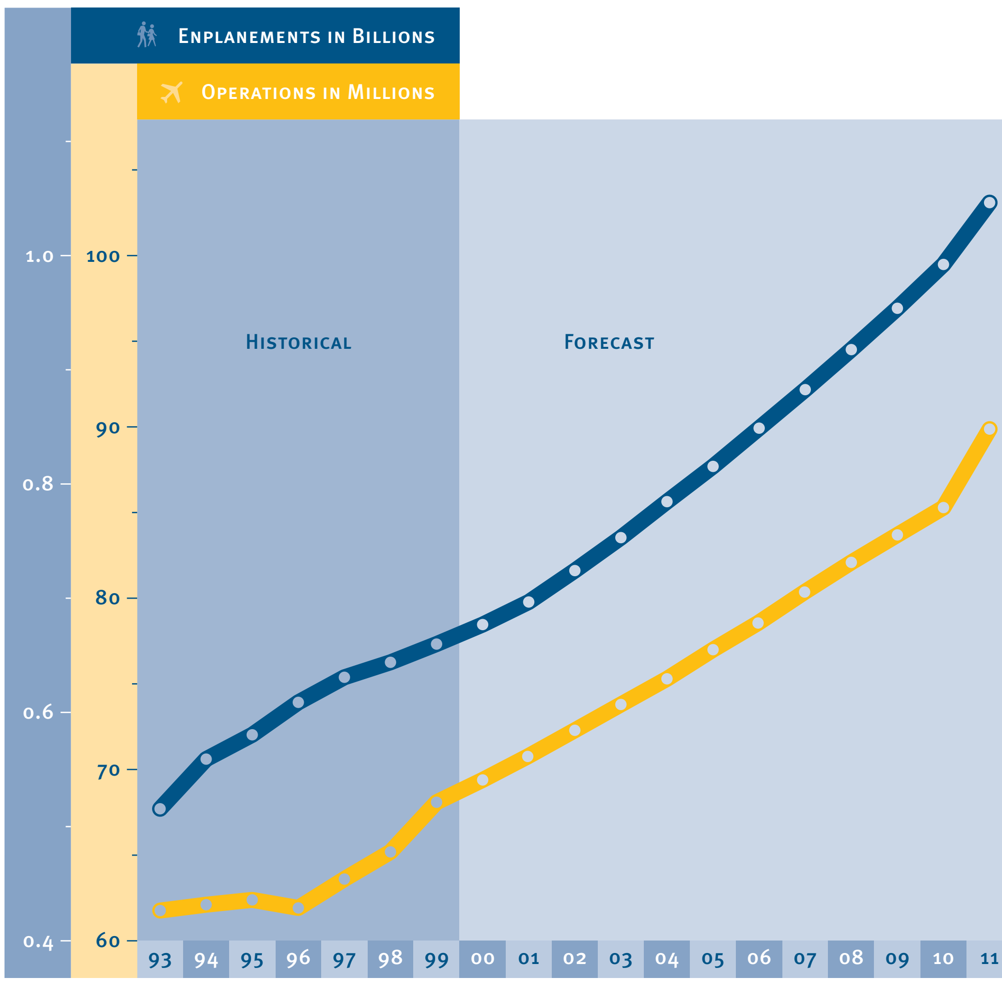
Aviation activity in the United States involves a number of diverse participants: large commercial air carriers, regional/commuter airlines, the military, and general aviation operators. Passenger enplanements, aircraft operations, and air cargo tonnage are all indicators of aviation activity. This chapter provides statistics on current and projected aviation activity, and describes significant developments in the sources of demand.

3.1 Passenger Enplanements and Aircraft Operations

In FY 1999, passenger enplanements grew by 2.6 percent to 659.9 million, following the growth of the U.S. economy. In the same period, the number of aircraft operations rose by 4.1 percent to 68 million. The FAA forecasts that enplanements will top one billion for the first time in 2010 and reach 1.046 billion in 2011, an increase of 59 percent over 1999. Operations are forecast to reach 86.9 million in 2011, an increase of 28 percent over the 12-year period. Figure 3-1 shows the trend in passenger enplanements and aircraft operations from 1994 through 2011.[3]

Figure 3-1

Enplanements and Operations, FY 1994-2011



3 Most FAA statistics and all forecasts are reported by fiscal year. The ACE Plan reports activity statistics by fiscal year to facilitate comparisons with the forecasts. Figures that report calendar year data are specifically identified as such.

3.1.1 Enplanements and Operations at the Busiest Airports

Enplanements and operations for the busiest 100 airports in the U.S., as measured by 1999 passenger enplanements, are shown in Appendix A. Because of the concentration of commercial traffic at larger airports and the dispersion of general aviation operations across a wide range of airports, those 100 airports accounted for more than 96 percent of total passenger enplanements, but only 42 percent of total aircraft operations. The number of enplanements at the 100 busiest airports increased from 609.9 million in 1998 to 634.8 million in 1999, a 4.1 percent increase. In the same period, operations at the 100 busiest airports increased by 3.3 percent, from 27.5 to 28.4 million. The FAA forecasts that enplanements at these airports will grow to 994.2 million in 2011 (an increase of 57 percent) and that operations will increase to 36 million (up 27 percent).

The concentration of traffic at the largest airports is highlighted in Figures 3-2 and 3-3, which show the busiest ten U.S. airports during 1999, as measured by enplanements and operations, respectively, and the FAA forecasts for the same airports in 2011. The busiest ten airports accounted for 35.5 percent of total passenger enplanements in 1999 and only 9.7 percent of total aircraft operations. The FAA forecasts growth in both enplanements and operations at these ten airports to keep pace with national trends.[4]

ID	Airport Name	FY 1999	FY 2011	Percent Growth
ATL	Hartsfield Atlanta International	37,606,932	60,849,000	61.8%
ORD	Chicago O'Hare International	34,418,016	50,335,000	46.2%
LAX	Los Angeles International	30,436,893	46,468,000	52.7%
DFW	Dallas/Fort Worth International	28,074,665	45,224,000	61.1%
SFO	San Francisco International	19,262,805	27,486,000	42.7%
DEN	Denver International	18,148,611	27,237,000	50.1%
DTW	Detroit Metropolitan Wayne County	16,910,175	28,412,000	68.0%
EWR	Newark International	16,794,443	25,012,000	48.9%
MIA	Miami International	16,561,634	28,246,000	70.6%
PHX	Phoenix Sky Harbor International	16,316,300	28,327,000	73.6%
	Total ➤	**234,532,473**	**367,598,011**	**56.7%**

Figure 3-2

Ten Busiest U.S. Airports by Enplanements FY 1999 and Forecast for FY 2011

ID	Airport Name	FY 1999	FY 2011	Percent Growth
ORD	Chicago O'Hare International	898,855	1,120,000	24.6%
ATL	Hartsfield Atlanta International	895,435	1,249,000	39.5%
DFW	Dallas/Fort Worth International	867,146	1,130,000	30.3%
LAX	Los Angeles International	771,337	1,023,000	32.6%
DTW	Detroit Metropolitan Wayne County	561,295	801,000	42.7%
PHX	Phoenix Sky Harbor International	555,793	801,000	44.1%
LAS	McCarran International	523,424	749,000	43.1%
MIA	Miami International	523,277	673,000	28.6%
OAK	Metropolitan Oakland International	508,454	605,000	19.0%
BOS	Boston Logan International	505,483	547,000	8.2%
	Total ➤	**6,612,498**	**8,700,011**	**31.0%**

Figure 3-3

Ten Busiest Airports by 1999 Operations FY 1999 and Forecast for FY 2011

4 The 1999 ACE Plan reported forecasts for individual airports for FY 2013. The forecasts in the 2000 ACE Plan extend only to 2011 to be consistent with the time frame of the national forecast, published in *The FAA Aerospace Forecast,* March 2000.

3.2 Air Cargo Activity

Air cargo is transported in the baggage compartments of passenger aircraft and by freighters. Figure 3-4 summarizes the amount of cargo loaded and unloaded at the busiest ten cargo airports for the past three calendar years.

Figure 3-4

Ten Busiest Cargo Airports

ID	City	Airport	1997	1998	1999
MEM	Memphis, TN	Memphis International	1,934	2,369	2,412
LAX	Los Angeles, CA	Los Angeles International	1,719	1,861	1,969
JFK	New York, NY	John F. Kennedy International	1,636	1,604	1,728
ANC	Anchorage, AK	Anchorage International	1,269	1,289	1,657
ORD	Miami, FL	Miami International	1,710	1,793	1,651
MIA	Chicago, IL	Chicago O'Hare International	1,260	1,402	1,481
SDF	Louisville, KY	Louisville International	1,369	1,395	1,440
EWR	Newark, NJ	Newark International	958	1,094	1,093
IND	Indianapolis, IN	Indianapolis International	609	813	1,041
DAY	Dayton, OH	Dayton International	767	893	895

Source: Airports Council International, *Worldwide Airport Traffic Report* 10, 2000

3.3 General Aviation Activity

General aviation (GA) includes all segments of the aviation industry except commercial air carriers and the military. The vast majority of the more than 19,000 U.S. airports, some 96.5 percent, are used exclusively by GA aircraft. Most of these are small rural airports and operations there have limited interaction with the air traffic control system. Nonetheless, there were over 40 million GA operations at airports with FAA and contract air traffic control service, well over 50 percent of total aircraft operations. Figure 3-5 shows the ten busiest general aviation airports, ranked by 1999 GA operations.

Figure 3-5

Ten Busiest General Aviation Airports FY 1999 Operations

ID	City/Airport	Air Carrier	General Aviation	Other	Total Ops
VNY	Van Nuys	0	564,979	5,994	570,973
LGB	Long Beach/Daughtery	15,518	480,538	8,568	504,624
APA	Denver/Centennial	2	401,493	30,828	432,323
DAB	Daytona Beach International	5,408	368,858	1,791	376,057
SFB	Orlando/Sanford	4,017	367,481	559	372,057
SNA	Santa Ana/John Wayne	81,999	358,612	7,621	448,232
PRC	Prescott/E.A. Love Field	226	349,299	5,319	354,844
FTW	Fort Worth Meacham	211	335,908	3,037	339,156
PTK	Pontiac/Oakland County International	612	324,054	12,392	337,058
OAK	Metropolitan Oakland International	162,766	290,175	55,513	508,454

General aviation also has a significant presence at major U.S. airports. Figure 3-6 shows that GA traffic accounted for ten percent of total aircraft operations at the 31 large-hub airports. The actual percentages varied from just 1.5 percent at Seattle-Tacoma to 37.5 percent at Honolulu. At seven of the busiest U.S. airports, GA operations represented more than 15 percent of operations.

Figure 3-6

Percentage of GA Activity at Large Hub Airports FY 1999 Operations

Airport	ID	Total Operations	GA Operations	GA % Total
Hartsfield Atlanta International	ATL	898,435	26,002	2.9%
Boston Logan International	BOS	505,483	35,537	7.0%
Baltimore-Washington International	BWI	306,819	35,467	11.6%
Charlotte-Douglas International	CHS	445,485	59,602	13.4%
Greater Cincinnati-Northern Kentucky Intl	CVG	466,030	30,043	6.4%%
Ronald Reagan National	DCA	315,737	60,790	19.3%
Denver International	DEN	494,884	17,003	3.4%
Dallas-Ft. Worth International	DFW	867,146	48,997	5.7%
Detroit Metropolitan Wayne County	DTW	561,295	71,689	12.8%
Newark International	EWR	463,492	19,060	4.1%
Fort Lauderdale-Hollywood International	FLL	279,823	94,100	33.6%
Honolulu International	HNL	245,002	91,803	37.5%
Washington Dulles International	IAD	459,098	64,429	14.0%
George Bush Intercontinental	IAH	460,158	25,302	5.5%
New York John F. Kennedy International	JFK	354,952	14,252	4.0%
Las Vegas McCarran International	LAS	523,424	133,815	25.6%
Los Angeles International	LAX	771,337	18,536	2.4%
New York LaGuardia International	LGA	367,520	19,469	5.3%
Orlando International	MCO	363,261	37,263	10.3%
Miami International	MIA	523,277	73,009	14.0%
Minneapolis-St. Paul International	MSP	505,064	112,670	22.3%
Chicago O'Hare International	ORD	898,855	28,880	3.2%
Philadelphia International	PHL	478,397	51,021	10.7%
Phoenix Sky Harbor International	PHX	563,843	83,791	14.9%
Greater Pittsburgh International	PIT	439,032	26,149	6.0%
San Diego International Lindbergh Field	SAN	224,095	16,847	7.5%
Seattle-Tacoma International	SEA	430,572	5,335	1.2%
San Francisco International	SFO	436,659	28,031	6.4%
Salt Lake City International	SLC	368,982	79,059	21.4%
Lambert St. Louis International	STL	503,538	23,837	4.7%
Tampa International	TPA	272,330	48,939	18.0%
Total ➤		**14,794,025**	**1,480,727**	**10.0%**

3.4 New Sources of Demand

The FAA forecasts robust growth for all existing aviation activity. A number of aviation industry developments may have long-term impacts on the demand for aviation services. Chapter One discussed the outlook for regional jet operations, an important new source of demand that is already having an impact. This section discusses the outlook for a number of additional sources of potential future demand: Fractional Ownership, the Small Aircraft Transportation System, New Large Aircraft, and Commercial Space Transportation.

3.4.1 Fractional Ownership

Fractional ownership allows participants to purchase a share in an aircraft for their occasional use. Unlike traditional time-share programs, in which several buyers purchase a single aircraft together and must coordinate schedules, fractional owners have full access to their aircraft or a comparable one, on as little as four hours notice. Using a business aircraft (owned by an individual or under a fractional arrangement) instead of a commercial airline allows travelers to bypass major airports and to take advantage of the thousands of general aviation airports, which are less congested and more dispersed.

Fractional ownership has grown steadily since its introduction and that growth appears to be accelerating. In 1999, the number of individual and corporate fractional shareowners grew from 1,215 to 1,693, a 39 percent increase, and the number of aircraft, primarily jets, in fractional programs grew from 253 to 370, a 46 percent increase.

Historically, most fractional ownership programs have operated under Federal Aviation Regulation (FAR) Part 91, which regulates general aviation business activities. However, some programs operate under Part 135, which regulates on-demand and scheduled air transportation and has more stringent requirements. In response to this rapid growth, the FAA has initiated a review of fractional programs to determine if they are operating within the appropriate regulatory structure.

In October 1999, the FAA created the Fractional Ownership Aviation Rulemaking Committee (FOARC), with representatives of fractional owners and managers, aircraft manufacturers, trade associations, the FAA, the Department of Transportation, foreign civil aviation authorities, and others. The FOARC met in November and December 1999 and presented its initial recommendations in February 2000. The committee's key recommendation was that the FAA create a new subpart K of Part 91 to standardize and clearly define the safety responsibilities of fractional owners and fractional ownership programs. The FOARC also suggested that comparable alternative means for compliance for certain part 135 on-demand air carriers be developed. The FAA is preparing a Notice of Proposed Rulemaking to incorporate the FOARC recommendations.

3.4.2 The Small Aircraft Transportation System

In October 1998, the FAA and NASA Administrators announced a plan to address the future of general aviation, the National General Aviation Roadmap. A key element of the GA Roadmap is the development of an intermodal, personal, rapid transit air travel system called The Small Aircraft Transportation System (SATS). Long-term SATS goals include:

- Reducing national travel times by 50 percent and providing near all weather access to 25 percent of the nation's public use airports
- Reducing the time it takes to become a pilot from seven months to three months and reducing the costs of learning to fly
- Increasing safety through advances in aircraft, avionics, and engine design

NASA and the FAA, along with various universities, manufacturers, and states are working together to develop SATS demonstration projects over the next decade. Manassas Regional Airport, Virginia's busiest general aviation airport, with 130,000 operations per year and 350 based aircraft, was designated the first SATS airport. Two other Virginia airports, Blacksburg and Newport News, were subsequently named. These airports have the required surface conditions, flight service providers, and airport equipment for a successful demonstration. Future plans include implementation of promising aviation technologies and upgrading existing Aviation Weather Operating Systems and Aviation Surface Observation Systems, weather dissemination equipment, and communications equipment. Differential GPS approaches, smaller runway protection zones, new approach procedures and an airborne internet-based self separation and queuing capability will be demonstrated by NASA and FAA at these airports.

3.4.3 New Large Aircraft

For the past several years, Boeing and Airbus have been considering developing new large aircraft (NLA) with seating capacities exceeding 400 passengers. Airbus foresees a demand for 1,300 passenger aircraft in the more than 400-seat category and 300 all-cargo derivatives over the next 20 years. Boeing's forecasts are much more conservative, predicting that carriers will need no more than 400 NLA in that period.

In June 2000, Airbus received approval from its shareholders to begin making offers to customers for a 555-seat double-deck jetliner, the A3XX. Their current timetable calls for a first flight in 2004 and entry into service in the last quarter of 2005. Boeing has tentative plans to develop a family of stretched versions of the 747, referred to as the 747X family, which will include a passenger, freighter, and long-distance airplane. The 747X passenger model would be capable of carrying more than 500 passengers.

Thirty years ago, when Boeing first introduced the 747, the FAA upgraded its standards and guidance material to accommodate that larger-than-typical aircraft. Today, with both Airbus and Boeing proposing introduction of a NLA, airport design standards are under scrutiny again. A substantial number of existing U.S. large-hub airports were designed to meet the requirements of the 747. These airports, with maximum 75-foot wide taxiways and separations and clearances that reflect operational requirements for aircraft with wingspans less than 65 meters, are referred to as design group V airports. Only a few U.S. airports have been built to or have had a portion of their airfield built to design group VI standards, capable of handling aircraft with wingspans of up to 80 meters. Accommodating NLA at design group V airports would require operational modifications, such as restricting traffic on adjacent runways or taxiways.

Airports that are now served by Boeing's 747 are the most likely candidates for NLA service. In 1998, the Airports Council International (ACI) surveyed airports about the construction costs of bringing an NLA into service. Los Angeles and Kennedy airports, which now have the most 747 passenger flights, estimated that it would cost more than $100 million to make the runway and taxiway modifications required to accommodate an NLA, using current design group VI standards. Terminal and apron modifications would push the costs even higher.

The FAA's NLA Facilitation Group, composed of representatives from Airbus, Boeing, ACI, a variety of FAA organizations, and a number of airports, is working to develop criteria under which a design group VI aircraft could operate at airports that have been built to design group V standards. A key strategy is to design a risk-based approach to determining safe airport clearances to replace the current wingspan-based formula.

The FAA is also reviewing its standards for wake vortex separation, which now rely on a weight-based formula. The FAA has proposed that manufacturers conduct the required studies to describe the wake vortex characteristics of an NLA. The results of those studies will aid the FAA in determining appropriate in-trail separation. Finally, the FAA is conducting taxiway deviation studies to assess the risk of an NLA running off a taxiway and whether obstacle free zones at design group V airports can safely handle an NLA in the case of a balked landing.

3.4.4 Commercial Space Transportation

The FAA's Associate Administrator for Commercial Space Transportation (AST) regulates the U.S. commercial space transportation industry, licenses commercial launches and launch sites, and manages the airspace required for commercial launches to ensure safety. Most commercial space launches contain communications, scientific, weather, or remote-sensing satellites and are financed by private corporations, states, the Air Force, and NASA. The majority of commercial space launches occur from federal spaceports where the Department of the Defense owns the infrastructure. Unlike airports, where the FAA builds and maintains air traffic control facilities, the FAA has no infrastructure at spaceports.

There are four FAA-licensed spaceports in the U.S.: Spaceport Florida, California Spaceport, Virginia Space Flight Center, and Kodiak Launch Complex (Alaska). Boeing Sea Launch, a sea-based floating platform financed by a Boeing-led international consortium, also operates under the authority of an FAA-issued launch license. Other possible sites for commercial launches include locations in New Mexico, Texas, Nevada, Utah, and Montana.

Since 1989, when the first commercial launch took place, 131 FAA-licensed launches have taken place. Market forecasts indicate that approximately 1,200 launches will occur worldwide over the next decade, with a majority of the launches being conducted in the United States by U.S. launch vehicle operators.

Commercial space launches so far have had little impact on NAS operations because of their infrequency of occurrence and because most launches have been conducted within restricted military airspace. However, as the number and types of launches increase, the FAA will be challenged to mitigate their impact on existing air traffic. Space vehicles are now launched vertically, but commercial space vehicles under development, including certain reusable launch vehicles (RLV), will depart horizontally, passing through the NAS to an airborne launch point where their vertical ascent is initiated. RLVs making horizontal departures may take off and re-enter under power using conventional runways, potentially at great speeds. New airspace structures will be required to provide dynamically reserved and released airspace to allow space vehicles to pass through the NAS.